

exhibiting a free swell index of between about 3.5 and about 5.0 and of a small diameter, having a density of between about 0.1 and about 0.8 g/cm<sup>3</sup> and a thermal conductivity below about 1 W/m/°K.

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12) The laminated sheet product of claim 11 wherein said coal exhibits a free swell index of between about 3.75 and about 4.5.

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13) The laminated sheet product of claim 12 wherein said skins comprise a material selected from the group consisting of aluminum, steel, polymer sheet, inconel, titanium, refractory metals, fiber reinforced polymer sheet and paper.

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14) The laminated sheet product of claim 12 wherein said sheet core has been carbonized.

15) The laminated sheet product of claim 12 wherein said sheet core is graphitized.

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16) A semi-crystalline, largely isotropic, coal-based carbon foam having a thermal conductivity below about 1 W/m/°K.

17) The carbon foam of claim 1 having a density of between about 0.1 and about 0.8 g/cm<sup>3</sup>.

18) A coal-based carbon foam produced by the direct heating of comminuted coal particles in a pressure controlled mold and under a non-oxidizing atmosphere to a temperature ranging from about 300° C to about 700° C.

19) A method for producing carbon foam comprising directly heating comminuted coal particles in a pressure controlled mold to a temperature ranging from about 300° C to about 700° C.

20) A method for producing a coal-based carbon foam comprising:

A) comminuting coal containing adequate volatiles to permit foaming thereof upon the application of heat, to a small particle size to form a ground coal;

C) placing said ground coal into a mold;

D) heating said ground coal in said mold under a non-oxidizing atmosphere to a temperature and for a period adequate to produce a controlled foaming of said coal to form a preform; and

E) controllably cooling said preform.